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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/082,309 05/20/98 WALDER A 15258-176-1U

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EXAMINER

STAICOVICI, S

ART UNIT	PAPER NUMBER
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1732

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DATE MAILED: 06/11/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/082,309

Applicant(s)

Andreas Walder

Examiner

Stefan Staicovici, Ph.D.

Group Art Unit

1732

☒ Responsive to communication(s) filed on May 20, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 16-29 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 16-29 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

- ✓ - on page 3, lines 17-21, of the instant specification, subject matter that is not relevant to the claimed invention is presented and as such should be deleted.
- ✓ - on page 6, line 16, "A" should be replaced with --A'-- in order to correspond with the subject matter presented in Figure 4.

Appropriate correction is required.

2. The abstract of the disclosure is objected to because of the following informalities:

- a grammatical error in line 15, "--by this mixing is avoided segregation"
- ✓ - on line 7, after "2", replace " , " with -- . --

Correction is required. See MPEP § 608.01(b).

Drawings

- ✓ 3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "20' ", "41", "42" and "43".

Correction is required.

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Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 16-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

✓ 6. The terms "elevated" (line 2), "extensive" (line 5), "substantially little" (line 9) and "several" (line 11) in claim 16 are relative terms which renders the claims indefinite. The terms "elevated" (line 2), "extensive" (line 5), "substantially little" (line 9) and "several" (line 11) are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claims 17-29 are rejected as dependent claims.

Claim 27 is redundant with claim 26 and as such should be canceled or amended to provide a further limitation of the parent claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 16 is rejected under 35 U.S.C. 102(b) as being anticipated by Pontiff (US Patent No. 5,026,736).

Pontiff ('736) teaches the claimed process for producing expandable plastics granulate including providing a plastic (polyethylene) mixture and a blowing agent, feeding the plastic mixture into an extruder, pumping (dispersing) a blowing agent into the extruder, blending the molten mixture and the blowing agent in the extruder until the blowing agent is fully dissolved into the molten resin, cooling the mixture, passing the cooled melt through a static mixer (mixing and retaining the mixture), extruding the mixture through a flat die and cutting the resulting extrudate into beads (granulate) (see col. 23, lines 15-36). It should be noted that although Pontiff ('736) does not directly teach "extensive shearing" while dispersing the blowing agent and "substantially little shearing" while retaining the mixture, it is inherent that extrusion occurs with "extensive shearing", while a "static mixer" promotes material mixing with low shearing forces. Therefore, it is submitted that the cited reference teaches "extensive shearing" while dispersing the blowing agent and "substantially little shearing" while retaining the mixture by its description of the type of apparatus used throughout the process, such as an extruder and respectively a static mixer. Furthermore, a static mixer inherently has a retention time which varies according to its size, hence the static mixer performs mixing and retaining functions.

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Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 16-17, 19-23, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Muirhead et al. (US Patent No. 3,372,215).

Buckner ('377) teaches the basic claimed process including providing an extruder (11), which is a source of heat plastified resin and a volatile fluid foaming (blowing) agent that is injected into the melt (col. 3, lines 48-53). The extruder (11) is in operative communication with processing units (15) and (16), that provide admixing of the blowing agent with the heat plastified polymer (col. 3, lines 62-64). As shown in Figure 1, the process line further includes processing units (17) and (18) remove heat (cooling) from the heat plastified mixture and bring the material to a desired (predetermined) temperature prior to discharge from the die (col. 3, lines 69-74). As detailed in column 4, lines 18-20 and col. 4, lines 37-41, processing units (15) - (18) are interfacial surface generators, which as explained in col. 2, line 44, an "interfacial surface generator" is a static mixer. It should be noted that although Buckner ('377) does not directly teach "extensive shearing" while dispersing the blowing agent and "substantially little shearing" while retaining the mixture, it is inherent that extrusion occurs with "extensive shearing", while a "static mixer" promotes material mixing with low shearing forces. Therefore, it is submitted that the cited reference teaches "extensive

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shearing” while dispersing the blowing agent and “substantially little shearing” while retaining the mixture by its description of the type of apparatus used throughout the process, such as an extruder and respectively a static mixer. Furthermore, a static mixer inherently has a retention time which varies according to its size, hence the static mixer performs mixing and retaining functions. However, Buckner ('377) does not teach granulating the cooled mixture. Muirhead *et al.* ('215) teach a process of forming expandable thermoplastic particles by extruding a heat plastified polymeric composition containing an expanding (blowing) agent in filamentary form, immediately cooling the extruded polymer and cutting the extruded and cooled polymer into particles (granules). It would have been obvious for one of ordinary skill in the art at the time of the invention to replace the die (19) in the process of Buckner ('377) with the die head (13), cooling bath (19) and cutter (20) of Muirhead *et al.* ('215) in order to form granulate material due to availability, process versatility and ease of processing.

Regarding claim 17, Buckner ('377) teaches the use of interfacial surface generator processing units (17) and (18), which are static mixers (see col. 2, lines 44-46), to remove heat (cooling) from the heat plastified mixture and bring the material to a desired (predetermined) temperature prior to discharge from the die (col. 3, lines 69-74).

In regard to claims 19-21, Muirhead *et al.* ('215) teach a process of forming expandable thermoplastic particles by extruding a heat plastified polymeric composition containing an expanding (blowing) agent in filamentary form, immediately cooling the extruded polymer in a water bath and cutting (disintegration) the extruded and cooled polymeric filament into particles (granules).

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Specifically regarding claim 22, Buckner ('377) teaches the use of additives with the thermoplastic melt.

Regarding claims 23 and 25, Buckner ('377) teaches that the choice of an interfacial surface generator (static mixer) is to be made with regard to the pressure drop occurring during viscous flow of the material within the flow line. Further, it is well known in the art that as material flows along a fluid transmission line a pressure drop occurs. It would have been obvious for one of ordinary skill in the art at the time of the invention to use routine experimentation to control the pressure drop throughout the flow line in the process of Buckner ('377) as modified by Muirhead *et al.* ('215) in order to control the density of the resulting product and hence improve product quality.

In regard to claim 28, Buckner ('377) teaches that fluid foaming (blowing) agent is added directly to the polymer source at the entry to or within the first interfacial surface generator (static mixer) (32), as shown in Figure 2. Hence, dispersing of the foaming (blowing) agent occurs in a first static mixer, while retaining and cooling of the resulting mixture is subsequently performed in static mixers (33) and (34).

11. Claims 18 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Muirhead *et al.* (US Patent No. 3,372,215) and in further view of Muller *et al.* (US Patent No. 4,314,606).

Buckner ('377) in view Muirhead *et al.* ('215) teach the basic claimed process as described above. However, Buckner ('377) as modified by Muirhead *et al.* ('215) do not teach cooling in a static mixer having elements crossing each other and formed as heat exchanging pipes. Muller *et al.*

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(‘606) teach an apparatus suitable for providing any fluid media (melt, paste, dough), heat exchange (heating and cooling) and mixing, including a series of pipes (2) as shown in Figure 1. It would have been obvious for one of ordinary skill in the art at the time of the invention to use the apparatus of Muller *et al.* (‘606) in the process of Buckner (‘377) as modified by Muirhead *et al.* (‘215) in order to reduce processing time by simultaneously mixing and cooling the extruded material, hence increasing productivity and lowering production costs.

12. Claims 24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Muirhead *et al.* (US Patent No. 3,372,215) and in further view of Suh (EP 0 445 847 A3).

Buckner (‘377) in view Muirhead *et al.* (‘215) teach the basic claimed process as described above. However, Buckner (‘377) as modified by Muirhead *et al.* (‘215) do not teach selectively increasing the pressure of the melt as it travels from the dispersing stage to the retaining stage and then to the cooling stage. Suh (EP 0 445 847 A3) teaches a process whereas the pressure is monitored throughout the flow line and its drift downwards (decrease) is corrected, hence in effect increasing the pressure, by reducing the temperature (hence increasing the viscosity), closing a throttle valve located between a mixer and a die and increasing the feed rate (page 3, lines 54-58). It would have been obvious for one of ordinary skill in the art at the time of the invention to increase the pressure of the thermoplastic melt and foaming (blowing) agent composition as taught by Suh (EP 0 445 847 A3) throughout the flow line in the process of Buckner (‘377) as modified by

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Muirhead *et al.* ('215) in order to have better process control, increase the density of the resulting product and improve process reliability.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-0396. The examiner can normally be reached on Monday-Friday 8:30 AM to 5:00 PM.

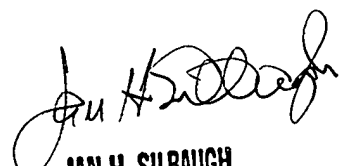
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jan H. Silbaugh, can be reached at (703) 308-3829. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

June 4, 1999



Stefan Staicovici, PhD


JAN H. SILBAUGH
SUPERVISORY PATENT EXAMINER
ART UNIT ~~17~~ 1732
06/07/99